REPRODUCTIVE BIOLOGY OF THE BLUELINE TILEFISH, *CAULOLATILUS MICROPS* (GOODE AND BEAN, 1878) OFF NORTH CAROLINA AND SOUTH CAROLINA

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Research on reproductive biology of blueline tilefish, *Caulolatilus microps*, reported herein is based on fish captured by hook and line fishing in depths of 70 to 235 meters off North Carolina and South Carolina from 1972 to 1977.

Monthly mean gonadsomatic index (GI) values for 138 female and 101 male blueline tilefish captured off North Carolina exhibited peaks in May and September. Initiation of gonadogenesis in March and April coincided with increasing photoperiod. In May and June, well developed and ripe ovaries were prevalent and comprised 2-4% total body weight. In July - August, developing, well developed, ripe, and spent redeveloping ovaries were all observed. In September, late developing and ripe ovaries predominated. Termination of gonadogenesis and gonad regression coincided with rapidly decreasing photoperiod in October. November through February was a period of gonad inactivity.

Size distribution of oocytes was multimodal in developing and ripe ovaries. Maturation of residual stock (previtellogenic) oocytes to the vitellogenic state was continuous and several size modes were present, but there was no sharp distinction between residual and maturing eggs in developing ovaries from March through September. Histologically, ovigerous lamellae in developing ovaries were mixtures of previtellogenic and active vitellogenic oocyte stages.

Limited data suggested that off South Carolina, blueline tilefish spawning may occur in April and again in July. Several larger females were also ripe off North Carolina in July, suggesting three spawning peaks or perhaps a more continuous spawning in that area with increased fish size.

Fecundity ranged from 210,000 ova (fish length = 412 mm TL) to 3,220,000 ova (fish length 637 mm TL) for 18 well developed and ripe females captured from April to June. Fecundity was significantly correlated with both TL and weight (g) and was best expressed by the

relationship ℓn Fecundity = 0.016 + 1.832 ℓn W (r^2 = 0.78). Fecundity estimates for well developed and ripe fish captured in July were also consistent with this relationship but fecundity estimates in September fell to only 1/2 to 1/3 of the summer estimates for similarly sized individuals.

Sexual maturity (50%) in female C. microps was attained at 425-450 mm TL (age 4-5 years) and all females were mature by age 6 (> 500 mm TL). Gonadsomatic index (GI) per size class was consistently greater for females captured off South Carolina.

Males accommodate the protracted period of oogensis by maintaining essentially constant spermatogenesis during the spawning period. Two peaks (May and September) in male GI occurred but testes sampled in all months and examined histologically were found to contain spermatozoa. Large numbers of spermatozoa were present in the testicular collecting tubules from April through September. Small male C. microps (< 500 mm TL) showed little testicular development. Consistent increases in GI per size class occurred in males > 500 mm TL off North Carolina, and > 600 mm TL off South Carolina. Histological examination of testes from males 390 to 500 mm TL revealed that all contained active spermatogenic tubules and collections of spermatozoa; these fish had previously been considered immature based on the macroscopic characters of size and coloration of the testes.

Spermatogenesis in C. microps testes follows a tubular developmental pattern. Active spermatogenic tubules pervade the solid testes, are ringlike in cross-section, and generally contain crypts at all stages of development. The morphogenesis of spermatid to spermatozoa coincides with passage from the crypt to the lumen of the spermatogenic tubule. Spermatogenic tubules course medially, merge, and channel the spermatozoa into collecting tubules.

Sex ratio by size class data indicated 1) a dominance of females < 500 mm TL, 2) essentially a 1:1 ratio from 500-600 mm TL, and 3) increasing dominance of males > 600 mm TL. The abundance of small females and larger males was attributed to differential growth rates (males grow faster, females mature earlier).

Juvenile protogynous sex reversal was observed in two specimens (178 and 186 mm TL; age I). Histological examination showed in proliferating testicular mesothelium which initiated medially, progressed and extended laterally. Peripheral portions of gonads contained transitional tissue and residual oocytes, while medial portions were composed of spermatogenic tubules.

Histological examination revealed previtellogenic oocytes in the medial connective tissue of collecting tubules from eight out of 41 testes (430-700 mm TL fish) which were otherwise morphologically normal and developing actively. No transitional ovo-testes were observed, except in juvenile specimens, but we had few winter collections. The occurrence of residual oocytes in developing testes could result from recent development of residual primary female (ovarian) gonocytes from a juvenile ovarian stage.